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(12) United States Patent

Marks et al.

(54) MOLDABLE NATURAL FIBER NONWOVEN WIRE HARNESS TROUGH AND METHOD OF CONSTRUCTION THEREOF

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See application file for complete search history.

(56) References Cited

U.S. PATENT DOCUMENTS

(Continued)

FOREIGN PATENT DOCUMENTS

DE 20300098 U1 3/2003

OTHER PUBLICATIONS

International Search Report, mailed Dec. 22, 2015 (PCT/US2015/051152).

(Continued)

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(57) ABSTRACT

A nonwoven trough and method of construction thereof are provided. The nonwoven trough includes at least one nonwoven wall formed from a mixture of bonded natural cellulosic fibers and thermoplastic fibers. The at least one nonwoven wall extends along a longitudinal axis and has a midsection and opposite end portions. The midsection has a base and a pair of walls extending upwardly from the base to provide the midsection with a generally U-shaped cross-section taken generally transversely to the longitudinal axis. At least one flange extends laterally from the at least one nonwoven wall, wherein the flange is configured for attachment to a vehicle member.

16 Claims, 8 Drawing Sheets

